**********FLIGHT INSTRUCTOR BULLETIN**********

BULLETIN NUMBER 8

TASK: BACK TO BASICS: The function and use of the rudder control.

SUBTASKS:* General
Seat Position
Taxiing
Rudder Coordination
Takeoff and climb

OBJECTIVE: Review the fundamental effects and use of the rudder pedals and rudder control from which all flying tasks and techniques are based.

STANDARDS: As outlined in the appropriate Practical Test Standard (PTS).

CONDITIONS: N/A

DESCRIPTION:

1. The Facts

A survey of Designated Pilot Examiners (DPE) and FAA Inspectors has revealed an alarming increase in pilot applicants being rejected (issued notices of disapproval) for certification based on the lack of some basic flight skill(s).

Too little emphases is placed on this area by flight instructors, yet it is the bases for all further training. Students that have trouble with rudder coordination will have trouble with most other tasks.

The examiner/inspections have found that many applicants do not have a complete understanding of coordinated use of flight controls. In addition, the applicants devoted so much energy to simply controlling the airplane, that little time and energy remained for other important tasks.

2. What can you do?

We offer the following review of information and suggestions to the flight instructor for teaching students basic use of the rudder:

A. General. When a student's focus is on the task of flying the aircraft, he/she does not have time to manage other aspects of the flight (example: checklist use, collision avoidance, obtaining a weather briefing, etc.). The flight instructor must ensure that the student possesses the mastery of the use of the flight controls, as a result, the student is able to devote less time physically flying the airplane and spend more time on the mental aspect of flying.

B. Seat position. The seat should be adjusted so that the pilot's knees are slightly bent and the balls of the feet are placed on the bottom of the rudder pedals with the heels on the floor. On each flight the pilot should be seated in the same position.

NOTE: Flight instructors must teach the student how to safely enter and exit the aircraft. When seated in the cockpit, the student must be able to see inside and outside references without straining. Poor visibility not only causes apprehension and confusion, but actually presents a hinderance to the control of the airplane. In addition, if the flight is conducted under instrument conditions, sitting too close to the instrument panel can cause instrument cross-check (scan) problems.

a. If the seat cannot be adjusted to provide for proper pilot visibility and aircraft control, cushions should be used. Do not use materials such as a telephone book; this may be uncomfortable and in time become a distraction.

CAUTION: The flight instructor must ensure that they teach the student the importance of locking the seat in position. Many accidents have occurred as a result of acceleration or deceleration during takeoffs and landings when the seat suddenly moved too close or too far away from the controls.

C. Taxiing. The rudder pedals are the primary source of directional control during taxiing.

a. The student should taxi with the heels of the feet resting on the cockpit floor and the balls of the feet on the bottom of the rudder pedal.

b. Taxi speed will be controlled using engine power. The primary requirement for a safe taxiing speed is safe, positive control; the ability to stop or turn where and when desired. The taxi speed should be such that when the throttle is closed the airplane may be stopped promptly.

c. While taxiing, clearance from obstructions and other aircraft must be ensured. Anytime there is a doubt about wingtip clearance, the airplane must be stopped, proceed no further and shutdown the engine. Seek assistance.

NOTE: During taxiing, the student may focus only ahead of the aircraft and concentrate on directional control during taxiing, forgetting about wing tip clearance. Therefore, the student must be trained to occasionally look side to side to maintain wing tip clearance.

d. When braking is required, first reduce the power to idle, then press the toes of the feet onto the brake portion of the rudder pedal to activate the brakes. If immediate, positive braking is required, the pilot can slide the feet up on the brake pedals and depress the rudder pedals.

NOTE: The brakes are used primarily to stop the airplane at a desired point, to slow the airplane, or as an aid in making a sharp turn. To avoid creating excessive heat on brake linings and unnecessary wear on the brakes pads, it is important that the flight instructor train the student not hold brake pressure (riding the brakes) during taxi.

D. Rudder coordination. Coordinated use of all controls is extremely important in any turn. Applying aileron pressure is necessary to place the airplane in the desired angle of bank, while simultaneous application of rudder pressure is required to counter the resultant adverse yaw. The same is true during rolling out of the turn.

a. During flight, the flight controls have a natural "live pressure" due to the force of the airflow around them.

With this in mind, the pilot should think not of moving the flight controls, but of exerting force on them against this live pressure or resistance.

b. Many students do not understand why they must apply rudder in the direction of the turn. The flight instructor must ensure complete understanding about the results of adverse yaw.

c. Flight instructors should practice rudder coordination exercises with their students. This is sometimes referred to as Dutch Rolls.

The maneuver is accomplished by setting up for cruise flight with aircraft properly trimmed. Align the aircraft's nose with a prominent landmark. Roll the wings up to approximately 20-30 degrees of bank to the left, then reverse to the right. The nose must remain aligned with the landmark using rudder control.

Perform this maneuver a few times and your student will start developing rudder control.

E. Takeoff and climb. Students must understand the use and function of the rudder during this critical phase of flight. Many students have lost directional control during takeoff because of lack of rudder skills.

a. This can be corrected with more complete training in the function of rudder control during taxi. In addition, when and where appropriate, the flight instructor can practice higher speed taxiing with their students.

b. On longer runways, flight instructors can practice performing wheelies with their students. This is accomplished by adding just enough engine power to keep the nose wheel off the ground while maintaining directional control down the runway with the rudders.